NEW JAPANESE FUNGI

NOTES AND TRANSLATIONS—XI

Tyôzaburô Tanaka

Helminthosporium Oryzae Miyabe & Hori sp. nov. ex S. Hori in Nôji Shikenjô Hôkoku (Bulletin of the Agric. Exper. Station), Nishigahara, Tôkyô, no. 18: 67–84. M. 34, xi, Nov., 1901. (Japanese); Saccardo, Sylloge fungorum 22: 1394. 1913 (nom. nud.); Oudemans, Enum. syst. fung. 1: 723. 1919 (nom. nud.).

Spots scattered or grouped, fuliginous or soot-color, velvety; conidiophores fascicled, 2–5 in group meeting rather loosely at the base, dark-brown, more or less bending, 7–15-septate, lowermost cell largest, rather rounded and swollen, width of cells gradually reduced toward the apex, terminated by blunt, thin-walled, light-colored or almost colorless cell, 100–330 x 6–8 μ; conidia lunate or obclavate bending to one side, obtuse at both ends, easily detached, pale-olivaceous of sooty shade, 6–11-septate, only slightly constricted at the septum, contents finely granular, 84–140 x 16–22 μ, germinating at both ends.

Parasitic on culms, leaves, and glumes of *Oryza sativa*.

Type localities: Experimental farm of the Imperial Agricultural Experiment Station, Nishigahara, Tôkyô, Sept., 1900 (S. Hori); Tôkyô-fu Minamitama-gun Motohachiôji-mura, Sept. 26, 1900 (S. Hori); Okayama-ken, Sept., 1900 (T. Nishida).

Japanese name of the disease: Ine Goma-hagarebyô (Sesame-spot leaf blight of rice plant) *ex* Hori in Dainippon Nôkwaihô (Journ. Agric. Soc., Japan), no. 380: 6. Feb., 1913. (Japanese.)

Hori later revised the description as follows: Conidiophores 2–3-fascicled, brownish, 100–330 x 7.2 μ; conidia 6–10-septate, fuscous. *See* Hori's Nôsakumotsu Byôgaku (Discourse on diseases of agricultural crops), Tôkyô, Seibidô, June, 1911, pp. 106–107. (Japanese.)

Illustration: Hori's original drawings of conidia and conidiophores are seen in the book above mentioned (p. 107). Ideta's

Handbook (*see* Mycologia 9: 167), p. 744, also gives fairly good illustrations of the fungus.

Both paddy and upland rices are infected. The fungus usually appears as minute spots on the leaf blade, about the size of sesame seeds, often elongated or confluent, forming larger spots. In such infected leaves, especially when the plant is young, the discoloration and withering soon follow, proceeding from the leaf-tip, often causing death of the entire plant. In an advanced stage of the disease characteristic brown velvety bodies are produced from the surface of the diseased spots.

K. Hara (in Hara's Ine no Byôgai, Diseases of the rice plant, Gifu-ken, June, 1918, p. 61, in Japanese) states that the Japanese rice blight fungus might be identical with that which had been described by Breda de Haan as *Helminthosporium Oryzae* (in Bull. l'Instit. Bot. Buitenzorg., no. 6: 11. 1900), though the description of the latter is rather imperfect. The present species, however, differs very strikingly from *H. macrocarpum* Grev. in the shape of the conidia which are obclavate or fusoid, whereas in the latter they are simply clavate (refer Fig. 249 CH of Engler & Prantl, Nat. Pflanzenfam. I, 1**: 479).

The disease was first known in Japan about 1895, but is now established everywhere as far as Formosa. Recently prevention through seed treatment and spraying with various kinds of fungicides has proved to be effective. *See* Nishikado, Y., in Byôchûgai Zasshi (Journ. Pl. Prot.), 5^9: 693–712, Sept., 1918, and Suyematsu, N., ditto, 7^1: 26–29, Jan., 1920 (both in Japanese). In a series of inoculation tests, a number of rice-plant varieties as well as wild grasses was examined by Suyematsu in connection with the susceptibility and resistance to the *Helminthosporium* rice blight. *See* Suyematsu, N., in Nôgaku Kwaihô (Journ. Sci. Agric. Soc.), Tôkyô, no. 212: 279–286, Apr., 1920; no. 214: 443–446, June, 1920; and no. 217: 655–657, Oct., 1920. (All in Japanese.)

GLOMERELLA CINNAMOMI Yoshino sp. nov. in Shokubutsugaku Zasshi (Bot. Mag.) Tôkyô, 21^{248}: 230–232, Pl. 5. M. 40, ix, Sept., 1907. (Japanese.)

Mycelia first colorless, later fulvous, hyphae mostly colored in

substratum, septate, 2–3.5 μ across; acervuli of conidial stage (Gloeosporium) minutely tuberculate, subepidermal, later erumpent, light pink in color; stromata disciform, brown; conidiophores densely seated on the stroma; conidia oblong, frequently ovoid ellipsoid or cuneate, often slightly curved, without guttulae or 1–2-guttulate, colorless, light pink in mass, variable in size but chiefly 10–18 x 4–6 μ; perithecia subepidermal, black punctiform, solitary or two together, globose or depressed-globose, slightly raised at the apex with orbicular ostiola 17–20 μ wide, brown or brownish-blue, 100–150 μ in diam.; asci numerous in one perithecium, fusoid, broad at the middle, narrowed near the apex, wall often thickened at the apex but not stained by iodine, 46–60 x 8–13 μ, octosporous, aparaphysate; ascospores oblong, narrowed at both ends, usually curved, hyaline, non-guttulate or guttulate, 10–15 x 3.5–5 μ.

On *Cinnamomum camphora,* infesting leaves, petioles, leaf-buds, and young shoots in the nursery, causing considerable damage. Old plants are also infected. Diseased spots are usually orbicular, elliptical, or fusiform, 3–5 mm. in diam., first reddish-brown, later becoming fuliginous, finally fading into light-brown. The infected area is definitely marked from the healthy part, usually sunken, and when severely affected the infected areas become confluent, causing brown rot of the surrounding part, finally girdling the stem and killing the entire plant.

TYPE LOCALITIES: Kumamoto-ken. Yatsushiro-gun, Dec. 29, 1905 (T. Tejimazaki); Kikuchi-gun Waifu-chô, Oct. 25, 1906 (K. Yoshino); Hôtaku-gun Ôe-mura, Nov., 1906 (K. Yoshino); Ashikita-gun Hinagu-chô, Dec., 1906 (K. Yoshino); Hôtaku-gun Kawachi-mura, May 12, 1907 (T. Nishida); and Saga-ken Saga-shi, Nov., 1906.

ILLUSTRATION: One copper plate giving ten figures, showing the diseased plant, conidial layer, germination of conidia, perithecia, asci, ascospores, and germination of ascospores.

DISTRIBUTION: Formosa. *See* Sawada, K., in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. Formosan Nat. Hist. Soc.), no. 25: 131–133. T. 5, x, Oct., 1916. (Japanese.)

Sawada states that the outbreak of the disease in the nursery and young plantation of camphor trees near Taihoku caused much damage in the spring of 1913. The Formosan fungus generally agrees with that described from Kyûshû by Yoshino, with the exception

of the smaller size of the ascospores, which Sawada finds to measure 12–13 x 5.5–7 μ. Sawada also revises the description of the fungus as follows: "Conidiophores straight or more or less curved, simple, hyaline, 16–27 x 3.5–4 μ; asci clavate-fusoid or fusoid, 53–67 x 8–8.5 μ."

Hara in Shokubutsugaku Zasshi (Bot. Mag.) Tôkyô, 27^{317}: 272 (Japanese) suggests to call the present species *Guignardia Cinnamomi* (erroneously spelled *cinnamomii*) on account of the lack of the stroma which should be present in *Glomerella.*

PHYSODERMA MAYDIS Miyabe in A. Ideta, Nippon Shokubutsu Byôrigaku (Handbook of plant diseases of Japan) ed. 4, Tôkyô, Shôkwabô, M. 42, 1909, part 1: 114, fig. 19. (Japanese.)

Cladochytrium sp. nov. K. Sengoku, in Ehime-ken Nôkwaihô Journ. Agr. Soc., Ehime prefecture) no. 32: 58, M. 34, xii, Dec., 1901. (Japanese.)

Cladochytrium Maydis Miyabe in Ideta's Nippon Shokubutsu Byôrigaku (Handb. Pl. Dis., Japan)[1] ed. 3, Tôkyô, Shôkwabô, M. 36, 1903, p. 75 (nomen nudum): Omori, J. & Yamada, G. Shokubutsu Byôrigaku (Plant pathology) Tôkyô, Hakubunkwan, M. 37, 1904, p. 202 (nomen nudum).

Occurs on the parenchymatous cells of the culm, midrib of the leaves, and the lower part of the husk, producing numerous orbicular, elliptical, or linear spots; spots mostly small-sized, often confluent, brown or fuliginous, light-colored near the margin, much deeper at the center; sporangia ellipsoid-ovate or globose, deep-brown, 24–26 x 22–24 μ.

Parasitic on *Zea Mais.*

[1] Referring to Ideta's Handbook of Plant Diseases here quoted, the first and second editions were published in 1901 and in 1902, respectively, under the title Jitsuyô Shokubutsu Byôrigaku (Practical discourse on plant diseases); the third edition, issued in 1903, was greatly enlarged and largely rewritten, and bears a new title, Nippon Shokubutsu Byôrigaku; it is called the third edition in the German title page only. The fourth edition, which came out under the same title, was issued originally in two parts, the first in 1909 (pp. 1–344) and the second in 1911 (pp. 345–935, with appendices), and is really a new work written under the critical supervision of Prof. K. Miyabe, who contributed diagnoses of some of his new species published here for the first time. Unaltered reprints of the fourth edition were issued in 1912 and in 1914, sometimes called fifth and sixth editions.

The disease does not usually prevent fruiting, but sometimes does when it occurs abundantly in the early stage of the host plant. In 1901 the disease was first discovered by K. Sengoku in the prefecture of Ehime, Shikoku island, and the above description is probably based upon the material collected at this time. It has not been reported from any other locality in the Japanese territory.

ILLUSTRATION: One black-and-white wood-cut figure showing sporangia.

Notes: *Physoderma zeae-maydis* Shaw, first reported from India (Sydow, H., Sydow, P., & Butler, E. J., in Annales mycologici 10^3: 245–247, fig. 2. 1912), and now known as the causal organism of one of the worst diseases of corn in the United States (*see* Tisdale, W. H., in Journ. Agr. Res. 16^5: 137–154, 10 pls., Feb., 1919), is, in many respects, identical with the present species, though no actual comparison of the organism has yet been carried out. Plant quarantine against this fungus was announced by the U. S. Department of Agriculture in 1916 (*see* Notice of Quarantine No. 24. 1916).

MYCOSPHAERELLA BAMBUSIFOLIA Miyake & Hara sp. nov. in Shokubutsugaku Zasshi (Bot. Mag.) Tôkyô, 24^{286}: 338–340, M. 43, xi, Nov., 1910. (Japanese.)

Foliicolous; pycnidia punctiform, black to the naked eye, immersed, globose or depressed-globose, fuliginous, open at the apex, 70–100 x 60–90 μ; pycnospores abundant, oozing from pycnidial opening when mature, ellipsoid ovoid or cylindrical, hyaline, 2–3.5 x 1–1.5 μ; pedicels minute; perithecia mixed with the pycnidia, globose or depressed-globose, 70–100 μ broad, 90–100 μ high, rarely 60 μ in diam.; wall thick, fungoid-parenchymatous, fuscous or black, ostiola as high as the epidermal plane or slightly raised; asci many, fasciculate, oblong-ovoid and more or less stipitate below or fusoid-lunate and obtuse at both ends, 37–50 x 9–10 μ, octosporous, aparaphysate; ascospores distichous, ovoid or ellipsoid, uniseptate, usually not constricted, hyaline, at first granular, usually becoming homogeneous later, 13–16 x 4.5–5 μ.

Parasitic on *Phyllostachys puberula* and *Phyllostachys bambusoides*.

Infected leaves develop round, elliptical, or irregular fuscous

spots of black periphery, which often run together in increasing size, finally causing death of the surrounding area. This gives the leaves a brownish appearance, and when they are severely infested the entire bamboo grove appears badly discolored and seriously injured. Later fruiting bodies make their appearance on the discolored area as minute black spots.

TYPE LOCALITIES: Gifu-ken Ena-gun Tôyama-mura and Kawauye-mura, Apr., 1908; Tôkyô Komaba, May, 1909.

Differs from *Mycosphaerella Arundinariae* Atk. (Bull. Corn. Univ. 3^1: 9. 1897) in the absence of brown hyphae around the perithecium, and in the shape and size of the asci and ascospores.

PHAEOSPHAERIA BAMBUSAE Miyake & Hara sp. nov. in Shokubutsugaku Zasshi (Bot. Mag.) Tôkyô, 24^{286}: 340–341, M. 43, xi, Nov., 1910. (Japanese.)

Foliicolous; spots appear along the vein, often with indefinite margin, brown or dark-colored, later becoming grayish or fuscous from the middle, finally covering the entire leaf; perithecia minutely punctiform, scattered or along the veins, immersed, globose or depressed-globose, black, 120–170 x 140–210 μ; wall rather thin, dark-colored or fuscous, ostiolate at the apex; asci numerous, fascicled, clavate or cylindrical, 65–90 x 18–27 μ, octosporous, aparaphysate; ascospores distichous or irregular, fusoid or ellipsoid, straight or slightly curved, triseptate, constricted, hyaline and granular when young, dark-colored with age, 25–30 x 10–12 μ.

Phyllosticta stage usually makes its appearance with the ascigerous stage on the same diseased spot as it does in the case of *Phaeosphaeria Oryzae* Miyake. (*See* Journ. Coll. Agric., Imp. Univ. Tokyo 2^4: 247. 1910.) The description of this form follows:

Pycnidia immersed, globose or depressed-globose, ostiolate at the apex, 100–140 x 70–100 μ; pycnospores ooze from the pycnidial opening when mature, ellipsoid or cylindrical, hyaline, 2–2.5 x 1.1–3 μ.

On the living leaves of *Arundinaria Simoni* and *Sasa paniculata*.

TYPE LOCALITIES: Tôkyô Komaba, July, 1906 (D. Karashima), July, 1910 (I. Miyake & K. Hara); Tochigi-ken Nikkô, Aug., 1910; Gifu-ken Ena-gun Kawauye-mura, Aug., 1910 (on the second host).

USTILAGINOIDEA SACCHARI-NARENGAE K. Sawada sp. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. of Formosan Nat. Hist. Soc.) 4^{15}: 4–5. T. 3, v, May, 1914. (Japanese.)

Ovary infesting, appearing in group on the ear of the host plant, dark olive in color, balloon- or top-shaped, rounded at the apex, 3 mm. long, first covered by a membrane, later rupturing at maturity, exposing the dark-olive spore mass inside, lower part of the mass being associated with glume and palea, hard, sclerotium-like, inside of the mass white or very light straw-color, composed of closely arranged angular cells; spores globose or ovoid, covered with comparatively large-sized warts, dark-olive, 4–5.5 usually 4.5–5 μ.

Parasitic on *Saccharum narenga.*

TYPE LOCALITY: Akôchô Hanshoryô Keishûshô, Formosa, Dec. 10, 1907. (Y. Shimada.)

The cross-section of the sclerotium-like body is entirely parenchymatous, and no parallel hyphae are visible as in the case of *Ustilaginoidea Oryzae* Bref.

PLASMOPARA WILDEMANIANA P. Henn. var. MACROSPORA K. Sawada var. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. Formosan Nat. Hist. Soc.) no. 16: 2–4. T. 3, vii, July, 1914. (Japanese.)

Foliicolous; spots irregular, often occupying the entire leaf, light yellowish-green, white mouldy on the lower surface; hyphae in mesophyl intercellular, invading the cell only by haustorium, colorless, continuous, branching, 7–13 μ thick; haustoria globose or ovoid-globose, 13–17 x 9–18 μ; conidiophores fascicled from the stoma, upright, 320–605 μ long, main axis 8–12 μ thick, slightly swollen at the base, first branching at about one half or one third of the whole length from the base, usually branching 5 to 7 times, terminal branchlets (commonly 4–8 μ long) and their underlying branchlets very short; conidia ovoid or elliptic-ovoid, rounded at the apex, papillate at the base, colorless, 14–18 x 11–13 μ.

Parasitic on the leaf of *Justicia procumbens.*

TYPE LOCALITY: Formosa. Taihokuchô Chônaihoshô, Sept. 12, 1908 (Y. Fujikuro), Apr. 5, 1913 (Y. Fujikuro).

The present variety has noticeably larger-sized conidia than those of the type species described by P. Hennings and later by Sydow

and Butler. (*See* Wildeman, E., Études Flor. Bas- & Moyen-Congo, Sér. 5. II^2: 85. 1907, and Ann. Mycol. 10^3: 243–244. fig. 1. June, 1912.) Sawada suggests that more noticeable difference may be revealed if they are closely compared as in the case of species of *Bremia*. (*See* Mycologia 11^2: 84–86. March, 1919.)

COLLETOTRICHUM BOEHMERIAE K. Sawada sp. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. Formosan Nat. Hist. Soc.) no. 17: 2. T. 3, ix, Sept., 1914. (Japanese.)

Foliicolous or caulicolous; spots scattered, cinereous with brown margin, orbicular and 1–2 mm. diam. on leaves, when on stem, forming orbicular, elliptical or fusiform spots, occasionally causing longitudinal rupture of the host epidermis, 1–6 x 0.8–2 mm. in size; hyphae colorless, 4 μ thick; acervuli small, with setae; conidiophores dense, short, terminated by conidia; conidia colorless, cylindrical or occasionally clavate, straight, obtuse at both ends, granular, 14–19 x 4–5 μ; setae dark-brown, tapering toward the apex, 1–2-septate, 45–85 x 4–5 μ.

Parasitic on Ramie (*Boehmeria nivea*).

TYPE LOCALITY: Taihokuchô Chônaihoshô, Formosa. June 29, 1914 (A. Imachi).

Stem infection causes bad staining of the bast fibers, which is hardly removable when the fibers are bleached. The infected plant, therefore, yields only lower grade fibers of less commercial value.

CERCOSPORA PIRICOLA K. Sawada sp. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. Formosan Nat. Hist. Soc.) no. 17: 3. T. 3, ix, Sept., 1914. (Japanese.)

Hypophyllous; spots usually angular, occupying certain area enclosed by veinlets, later coalesce, often cover the entire surface, cinereous, later changing into brown, generally 1–3 mm. in diam.; conidiophores fascicled, several or more than ten together, straight or curved, cinereous, 0–2-septate, 15–27 x 3–4 μ; conidia linear, curved, 3–5-septate, grayish or almost colorless, 28–57 x 2.5–3.5 μ.

On *Pirus communis* (pear) and *Pirus sinensis* (sand-pear).

TYPE LOCALITIES: Formosa. Taihokuchô Chônaihoshô, Jan. 15. 1910 (Y. Fujikuro), Sept. 2, 1911 (K. Sawada); Taichûchô Tai-

heishô, Aug. 6, 1911 (Y. Fujikuro); Kagichô Toroku, Apr. 30, 1913 (K. Sawada).

Resembles *Cercospora minima* Tracy & Earle (Bull. Torr. Bot. Cl. 23^5: 206. May, 1896) on pear from America, but differs in being hypophyllous and in having longer conidiophores and shorter but thicker conidia of grayish color, while the American species is characterized by being epiphyllous and having shorter conidiophores and slender and hyaline conidia.

The extent of injury due to this fungus is not known.

USTILAGO FORMOSANA K. Sawada sp. nov. in Taiwan Hakubutsu Gakkwai Kwaihô (Journ. Formosan Nat. Hist. Soc.) no. 34: 6–8. T. 7, v, May, 1918. (Japanese.)

Infesting inflorescence and the upper part of the culm; sori linear, fuliginous, 2.5–14 cm. long, at first enclosed by grayish-white membrane, later escaping from enclosing sheath, ruptures and emits black spore mass inside, leaving only fibrous tissue behind; spores globose or subangular-globose, light reddish-brown, containing granules, 5–7 μ generally 5.5–6 μ in diam.; epispore apparently smooth, but finely echinulate under close observation; promycelia very short and continuous, or somewhat longer and uniseptate, producing sporidia at the end or at the joint between two cells, 8–17 x 1–3 μ; sporidia fusoid to oblong-fusoid, often producing secondary sporidia thereupon, 3–6 x 1–2 μ; germinating tube sometimes formed on the promycelium.

On *Panicum proliferum*.

When the disease occurs in the field, whole culms arising from common root are infested.

TYPE LOCALITIES: Formosa. Taihokuchô Chônaihoshô, May, 1906 (S. Suzuki), Apr. 22, 1907 (Y. Fujikuro), Aug. 10, 1908 (Y. Fujikuro), Nov. 27, 1908 (K. Sawada), Dec. 4, 1908 (K. Sawada); Tôenchô Nanseishô, June 2, 1917 (K. Sawada); Taitôchô Daimabukutsu, Apr. 29, 1909 (K. Sawada); Taitôchô Toran, May 21, 1911 (K. Sawada).

Differs from *Ustilago Panici-proliferi* P. Henn., which occurs on *Panicum proliferum acuminatum* in America, in having distinctly smaller spores.

BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.